

**REMARKS:**

In the afore-mentioned advisory action, the examiner noted that "the new claim limitations comprising 'maintaining cell energy within the plant when the plant is subjected to a low oxygen environment and wherein the nonsymbiotic plant hemoglobin is a nonsymbiotic plant hemoglobin that is not involved in oxygen diffusion' require further consideration and search".

It is noted that in the subsequent telephone conversation, the examiner maintained that the additional limitations to the claims would require additional, broader searching and requested that applicants submit any request for reconsideration in writing.

As discussed in the response filed August 19, 2003, applicants note that the amendments consist of a restructuring of the wording of the claims and additional definition of the nonsymbiotic plant hemoglobin which was requested by the Examiner. Applicants maintain that no new issues have been raised.

As discussed in the afore-mentioned response, applicants note that one of skill in the art would understand that the nonsymbiotic plant hemoglobins are distinct and different from hemoglobin, myoglobin and leghemoglobin. This is supported by Andersson et al. which states in the abstract that the nonsymbiotic plant hemoglobin is distinct from the leghemoglobin and also by Duff et al. (JBC 272: 16746-16752) which includes a comparison of the oxygen binding characteristics of numerous oxygen binding proteins. However, in an effort to advance examination, the claims were amended to state that the nonsymbiotic

plant hemoglobin is a nonsymbiotic plant hemoglobin that is not involved in oxygen diffusion.

Given that this amendment was effectively requested by the examiner and restricts the claims, and a broad search has been carried out already on nonsymbiotic plant hemoglobins, it is unclear as to why the examiner feels additional searching is required. That is, the amendment of the claim restricts the claim to those nonsymbiotic plant hemoglobins which are not involved in oxygen diffusion which the examiner felt was necessary to distinguish applicants' invention from Bailey and/or Andersson.

It is further noted that this application was conditionally allowed on May 7, 2002 subject to additional searching by the examiner. It was agreed by the examiner and her supervisor that this searching would be done without requiring a request for continuing examination.

However, an advisory action was then issued on May 30 indicating that the amendments would not be entered. A reference was subsequently provided by the examiner which the examiner felt justified additional searching. This reference was not subsequently cited although it was felt that yet further searching was justified. Consequently, a request for continuing examination was filed July 24, 2002.

An office action was issued August 21, 2002, rejecting the claims based on the combination of Andersson and Bailey. It is noted that Bailey had been previously cited and Andersson was discussed in the application as filed.

As noted in the response filed November 20, 2002, the proteins described by Bailey have significantly different oxygen binding properties compared to the nonsymbiotic plant hemoglobins. As discussed in that response, one of skill in the art would recognize that the nonsymbiotic plant hemoglobins are distinct from those envisioned by Bailey and it would therefore be surprising that these proteins would have useful properties, as discussed in detail in the application as filed and in this response.

However, a further office action was issued on February 14 wherein the examiner rejected the claims again in view of Bailey and Andersson and in view of US Patent 5,563,324, presumably located during additional searching by the examiner.

The objections in view of US Patent 5,563,324 were subsequently held to be moot because the sections to which the examiner made reference were in fact found in US Patent 6,372,961, which was not prior art.

Regarding Bailey and Andersson, it was again pointed out to the examiner that Bailey in fact teaches against use of non-symbiotic hemoglobins. It was further noted that the benefits proposed by Andersson to overexpression of nonsymbiotic hemoglobins were found to be incorrect by applicants' experiments. Thus, as stated in this response, even if one were to combine Bailey and Andersson, one would not find any of the benefits proposed by Andersson. It was only when applicants expressed the nonsymbiotic plant hemoglobins under a nitrogen atmosphere that the benefit thereof was realized.

These arguments were repeated in the latest response. As discussed therein and as discussed above, in an effort to advance examination of this application, the additional limitation was added at that time to further distinguish the use of nonsymbiotic hemoglobins in applicants' invention from the teachings of Bailey and the suggestions of Andersson.

Thus, as discussed in the previous response, applicants have shown that the teachings of Bailey teach against combining Bailey with Andersson because the nonsymbiotic plant hemoglobins have vastly different oxygen binding properties than the proteins described by Bailey. It is further noted that this would be clear to one of skill in the art who would know that the nonsymbiotic plant hemoglobins and the proteins described by Bailey are different. This is clearly supported in the art, as discussed above. Furthermore, as discussed previously and herein, even if one were to combine Bailey and Andersson and look for the benefits suggested by Bailey, one would conclude that the nonsymbiotic plant hemoglobins had no effect because the benefits suggested by Bailey were not detected, as discussed in the application as filed.

Regarding additional searching, it is noted that as discussed above, the examiner has carried out at least three additional searches and has not located any additional relevant prior art relating to nonsymbiotic plant hemoglobins. Applicants are therefore unclear as to why yet further searching is required at this stage.

In summary, as discussed above and previously, Bailey specifically teaches against using proteins having the oxygen binding characteristics of the

nonsymbiotic hemoglobins which are understood by one of skill in the art to be a distinct class of oxygen binding proteins, specifically distinct from the leghemoglobins et al described by Bailey. As such, Bailey teaches against use of the proteins described by Andersson. It is further noted that Andersson at best indicates that overexpression of nonsymbiotic plant hemoglobins is "worth a try" but does not guarantee success. Furthermore, as discussed in the application as filed and in the previous responses, when applicants looked for the benefits proposed by Andersson, they found that the nonsymbiotic plant hemoglobins appeared to have no effect and it was only when the nonsymbiotic plant hemoglobins were expressed under a nitrogen atmosphere that their benefit was discovered. Thus, as discussed in the earlier responses, one combining Andersson and Bailey and looking for the benefits proposed by Andersson would find that the nonsymbiotic plant hemoglobins appeared to have no effect.

Regarding the amendment to the claims, the examiner is hereby authorized to cancel "wherein the nonsymbiotic plant hemoglobin is a nonsymbiotic plant hemoglobin is not involved in oxygen diffusion" from the claims if the examiner feels that this broadens the claim. If on the other hand the examiner maintains that this limitation is needed to distinguish applicants' invention from Bailey and Andersson, applicants accept that decision in view of their desire to advance prosecution of this application. If this is the case, it is clear that additional searching should not be required in view of the added limitation and the multiple searches already done.

Applicants maintain that the above arguments clearly establish that the combination of Bailey and Andersson is improper or in the contrary would not lead one of skill in the art to applicants' invention, given that Bailey teaches against such a combination and the benefits proposed by Andersson were incorrect, as discussed in greater detail above and in the previous responses. In view of this, it is respectfully requested that the final action be cancelled and the application be allowed. In view of the foregoing, further and more favorable consideration is respectfully requested.

Respectfully submitted

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Enc.(2)

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